REMARKS

Claims 1-32 are in the case. The claims have been made subject to a requirement to restrict. As a result of applicants' election of claims made in November of 2004, Claims 6 and 13-18 are in the case.

Claim 16 has been amended to more clearly define applicants invention.

All claims stand rejected under 35 USC § 112.

No new matter has been added.

The paragraph number below correspond to those used in the present action.

Specification

3. The specification has been objected to for the misspelling of "hereby" on line 5 of page 1. The spelling has been corrected.

Claim Rejections – 35 USC § 112

4. Claim 16 is rejected under 35 USC § 112, second paragraph for indefiniteness. The limitation "the transformed host cell" in line 1 of claim 17 lacks antecedent basis in claim 16. Claim 16 has been amended to overcome this rejection.

5., 6 Claims 6, 13, 14, 15 16, 17 and 18 are rejected under 35 USC § 112, first paragraph as failing to comply with the written description requirement. Applicants traverse.

The examiner suggests that the claims are broadly drawn to an isolated nucleic acid that comprises the *crtE, crtX, crtY, crtI, crtB* and *crtZ*, genes from any source encoding the crtE, crtX, crtY, crtI, crtB and crtZ polypeptides from any source and from any sequence. Applicants respectfully disagree.

The claims are limited to the nucleic acid molecule as defined by SEQ ID NO:18. As such, the source and structure of the recited genes and encoded polypeptides cannot be from any source or sequence but must fit within the narrowly defined constraints of the recited sequence. SEQ ID NO: 18 is clearly described in the specification and thus the specific genes and encoded polypeptides embodied therein are also adequately described. Applicants submit that the scope of the claims does not extend beyond the description in the disclosure and thus meet all the requirements of 35 USC § 112, first paragraph.

Additionally the claims are rejected for lacking written description for sequences having at least 95% identity to SEQ ID NO:18. The examiner takes the position that, because there are no examples of a sequence having at least 95% identity to SEQ ID NO:18 that the claim fails for lack of written description. Applicants respectfully traverse. Applicants find that the examiner has misstated the scope of the claim.

Support for a sequence having at least 95% identity to SEQ ID NO:18 may be found on page 4, line 38 and on page 30, line 6 of the specification. Thus there is basis in the

specification for the recited limitation. Additionally, the claim is not limited to the isolated recitation of a sequence having at least 95% identity to SEQ ID NO:18 alone, but rather in combination with the limitation that"... wherein the isolated nucleic acid molecule encodes all of the polypeptides crtE, crtX, crtY, crtI, crtB and crtZ".

It is axiomatic that the to satisfy the written description requirement, a patent specification must describe the claimed invention in sufficient detail that one skilled in the art can reasonably conclude that the inventor had possession of the claimed invention. Additionally it is well settled that:

> "What is conventional or well known to one of ordinary skill in the art need not be disclosed in detail. See *Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d at 1384, 231 USPQ at 94. If a skilled artisan would have understood the inventor to be in possession of the claimed invention at the time of filing, even if every nuance of the claims is not explicitly described in the specification, then the adequate description requirement is met. See, e.g., *Vas-Cath*, 935 F.2d at 1563, 19 USPQ2d at 1116; *Martin v. Johnson*, 454 F.2d 746, 751, 172 USPQ 391, 395 (CCPA 1972) (stating "the description need not be *in ipsis verbis* [i.e., "in the same words"] to be sufficient"). " MPEP 2163]

Applicants submit that the claim is narrow as drafted, and that the person of skill in the art, when combining both the limitations of the 95% identity at the base level with the requirement that the sequence encode all of the recited enzymes would fairly understand that the Applicants were in possession of the invention as claimed and that a specific sequence having the 95% is tantamount to requiring that "...every nuance of the claims is ... explicitly described in the specification" in contradiction of the guidance give in the MPEP.

7. Claim 16 is rejected under 35 USC § 112 for failing to comply with the written description requirement. The Examiner finds there is inadequate description for a broad range of host cells and in particular, does not describe the transformation of plant and animal hosts.

The transformation of plant and animal host cells is well known in the art and methods are ubiquitous and well within the grasp of the skilled artisan. Additionally many of the sequences of the present invention encode enzymes that have homologs in plants (see the detailed discussion in the background of the invention; and the discussion of the lower carotenoid biosynthetic pathway on page 25) and the skilled person would understand that expression of these enzymes in plant hosts was in the possession of the Applicants at the time the invention was made.

The foregoing notwithstanding, Applicants have amended the claim to recite a "microbial" host cell, which Applicants submit, is well described in the specification.

8. Claims 6, 13, 14, 15, 16, 17 and 18 are rejected under 35 USC § 112 as failing to comply with the enablement requirement.

The examiner argues that the claims are broadly drawn to an isolated nucleic acid that comprises the *crtE, crtX, crtY, crtI, crtB* and *crtZ*, genes. The examiner is in error. The claims are drawn to the limited scope of a specific sequence (SEQ ID NO:18) which additionally contains genetic material which encodes all of the enzymes crtE, crtX, crtY, crtI, crtB and crtZ. This sequence is fully enabled by the specification and the examples.

The examiner suggest that the specification, and in particular example 4, fails to teach (i) whether the gene fragment used to transform *Methylomonas* 16a was indeed SEQ ID NO:18 and (ii) does not teach methods for the transformation of *Methylomonas* 16a; and as a result the skilled person would not know how to use the invention.

The specification teaches that the gene cluster containing entire set of genes (*crtE, crtX, crtY, crtI, crtB* and *crtZ*) was isolated from strain DC260 and corresponded to SEQ ID NO:18 (page 27, line 33); Example 4 states that "... the *crt* gene cluster comprising the *crtEXYIB* genes from DC260 (Example 3) [was introduced] into *Methylomonas* 16a (ATCC PTA 2402)..." Applicants submit that it is clear that SEQ ID NO:18 was used in Example 4.

As to point (ii) above, the specification, on page 45, details extensively, methods for the transformation of C1 metabolizing bacteria of which *Methylomonas* 16a is one. Applicants submit that the specification is more than enabling on both of these points and that the skilled person would indeed know how to practice the claimed invention.

9. Claims 6, 13, 14, 15, 16, 17, 17 are rejected under 35 USC § 112 1st paragraph as failing to comply with the enablement requirement. The Examiner suggests that the specification does not teach how to make and use any isolated nucleic acid comprising all of the *crtE, crtX, crtY, crtI, crtB* and *crtZ*. Applicants submit that the examiner has misstated the scope of the claim. The specification does teach how to make and use SEQ ID NO:18 comprising all of the genes *crtE, crtX, crtY, crtI, crtB* and *crtZ*. Such a demonstration is found in examples 3 and 4 and throughout the specification. The examiner suggests that the specification is not enabling for a claim having at least 95% identity to SEQ ID NO:18. However this again misstates the scope of the claim which recites the additional limitation that the sequence encode all of the polypeptides crtE, crtX, crtY, crtI, crtB and crtZ.

Additionally, as above, the examiner suggests that the specification fails to teach (i) whether the gene fragment used to transform *Methylomonas* 16a was indeed SEQ ID NO:18 and (ii) does not teach methods for the transformation of *Methylomonas* 16a; and as a result the skilled person would not know how to use the invention. Applicants arguments presented above are relevant here and are hereby incorporated by reference. In brief, the specification clearly provides teaching of transformation methods and clearly indicates that SEQ ID NO:18 is used in example 4.

10. Claim 16 is rejected under 35 USC § 112, 1st paragraph for lack of enablement. Specifically the examiner finds that all host cells are not enabled by the specification. Applicants have amended claim 16 in response to the rejection for lack of written description and submit that the claim as amended is fully enabled.

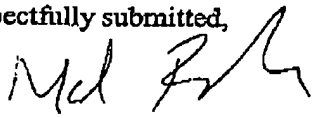
11. Claims 6, 13 14, 15, 16, 17 and 18 are rejected under 35 USC § 112, 1st paragraph for lack of enablement. The examiner suggests that strain DC260 is essential to the claimed invention and it must be obtainable by a repeatable method or made available to the public.

Applicants submit that strain DC260 is not essential to the claimed invention – SEQ ID NO:18 is essential to the claimed invention. In order to practice the claimed invention all that is required is the sequence of the gene cluster which has been provided in the sequence listing. Given the sequence of the gene cluster the person of skill in the art will readily be able to make the sequence and insert it into an appropriate plasmid for transformation of a host cell and the production of carotenoids. Applicants submit that no deposit is necessary.

In view of the foregoing Applicants submit that the claims are in condition for allowance and respectfully request reconsideration of the claims as amended and removal of all rejections.

Should there be any fee due in connection with the filing of this Response please charge such fee to Deposit Account No. 04-1928 (E. I. du Pont de Nemours and Company).

Respectfully submitted,



S. NEIL FELTHAM
ATTORNEY FOR APPLICANTS
Registration No.: 36,506
Telephone: (302) 992-6460
Facsimile: (302) 992-5374

Dated: May 18, 2005